DETACHABLE JOYSTICK FOR A PORTABLE COMPUTER

FIELD OF THE INVENTION

The present invention is related to portable computers and in particular to attaching a joystick to a portable computer.

BACKGROUND OF THE INVENTION

Portable computers ("lap-tops") have become as powerful as desktop computers and many lap-top owners are using a lap-top as their primary computer system. These users need the ability to run a wide spectrum of software and to connect various kinds of peripherals to their lap-tops.

One of the peripherals users frequently employ is a pointing device to control the cursor on the computer screen and to execute commands. Users want a minimum amount of elapsed time between the time they move the pointing device and the time the cursor changes its position, and between the time they press a button on the pointing device and the appropriate command is executed ("response time"). For general application software, a mouse or trackball connected to the computer through a serial port provides sufficient responsiveness. However, users of game software and other near real-time applications demand almost instantaneous response time from the pointer device which cannot be provided by serial mice or trackballs because of the limitations of the serial interface.

When a serial pointing device has information to send, it generates an "attention" signal, called an "interrupt", to the computer. The device then waits until the computer requests the data. Once the computer notified the device it is ready to receive the data, the device sends electrical signals to the computer that are translated by specialized software into cursor position coordinates and executory commands. However, the device can only send the information one bit at a time, i.e. serially. Because the serial interface must wait for its interrupt to be acknowledged and must send its data serially, serial pointing devices do not transmit information to the computer quickly enough for near real-time applications such as computer games.

To provide the almost instantaneous response time required for game-type software, personal computer manufacturers developed a special interface, usually called a game port. This interface sends the cursor position coordinate and executory command signals in parallel rather than serially. Also, unlike the operation of the serial interface, the computer does not wait for the game port to notify the computer that the port has data but instead the computer queries the port at regular intervals. The frequency of these queries, otherwise known as the polling rate, determines the response time of the device. With the polling rate set at a high value, the game port can provide near real-time response.

Unlike general applications, an integral part of game software is the requirement for rapid cursor movement throughout the 2-dimensional plane of the computer screen combined with the ability to simultaneously execute commands. Neither mice nor trackballs are designed to provide this functionality. Instead most game players use a device called a joystick for complete enjoyment and control of the game action. Joysticks are patterned after airplane control sticks and allow for quick 360° changes in cursor direction by corresponding movements of the control stick. In addition, most joysticks have at least one button built into the stick to "fire" commands to the computer while the control stick is being manipulated. Although some joysticks are serial devices, the majority are designed to interface to the game port to provide a desired quick response.

Therefore, lap-top users who want the most enjoyment from their game software need a joystick connected to a game port. In response, some manufacturers have provided game ports on their lap-tops but the implementation of the joystick presents several problems. A standard joystick is a cumbersome device because of the control stick protruding from its base. The base is usually weighted and given non-skid pads to prevent it from sliding around due to the torque generated by the user when manipulating the control stick. In addition, a standard joystick has a cable that connects to the game port to transmit the cursor position coordinate and executory command signals from the joystick to the computer. This cable must make good electrical contact with the game port to avoid data loss. However, the game port connector on many joystick cables is simply a plug that fits over or into the game port. On other cables, the connector has screws to secure it to the game port. Neither type guarantees a good electrical contact as the connector can be dislodged easily if the cable is jerked or pulled due to the looseness of the fit between the plug and the game port, or because users seldom bother to screw the second type of connector in place. The long length of the cable combined with its limited flexibility due to the wiring it contains only adds to the bulk of the joystick.

The advantage of a lap-top computer is that it can be operated virtually anywhere, but game players often find themselves in unwieldy positions when using a joystick with a lap-top. On an airplane, for instance, users usually resort to putting the lap-top on the fold-down tray, holding the joystick in one hand while manipulating it with the other, and coiling the excess cable out of harms way in their laps. These drawbacks make using a standard joystick with a lap-top in tight quarters an awkward challenge.

Permanently mounting a joystick to the lap-top would alleviate most of the drawbacks associated with using a standard joystick. The lap-top would provide the mass necessary to keep the joystick in place. However, the shape of a joystick makes implementation of the concept impractical. The control stick protruding from a lap-top case could be easily damaged and would prevent the lap-top from fitting well in a brief case. In addition, space on a lap-top case is always at a premium and the area taken up by the joystick is lost to any other use.

Various ideas for temporarily attaching a standard joystick to a computer case have been tried, usually using Velco™ or sticky tapes. However, the user still must contend with the long joystick cable and the vulnerable connection between the cable plug and the game port. Furthermore, the nature of such temporary attachments is to be easily detached and the user must be careful not to apply so much force to the control stick that the temporary attachment is dislodged. Finally, a standard joystick still has a weighted base and increases the load the lap-top user carries.

SUMMARY OF THE INVENTION

A portable computer ("lap-top") has a special receptacle built into the palm rest portion of its case. A detachable joystick with a mounting bracket that fits into the receptacle and a locking arrangement secures the mounting bracket in the receptacle. Electrical connections are integrated into the bracket and receptacle for relaying electrical signals generated by the joystick to the portable computer.